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APG

CLASSIFICATION CANCELLED

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For the Atomic Energy Commission

RAYMOND A. CARPENTER *RC*

for the

Chief, Declassification Branch

August 9, 1944

DCU-A 32429

To: File

From: A. B. Greninger

In Re: Die Casting of Coatings on Slugs, Alcoa; Run #2, August 3 and 4, 1944

A second trip was made to the Garwood plant of Alcoa on the above dates by J. H. Chapin, J. M. Simmons, L. M. Foster, and A. B. Greninger. Approximately 40 tuballoy pieces were available with the aluminum pins (see MUC-ABG-228, August 1). The objective was to prepare a number of pieces, unbonded but with a complete closure, that would be used for corrosion tests at Site B. The die had previously been modified by Alcoa to produce a maximum of washing action around the aluminum pin at the vent end.

It was concluded after the first days' operation that the insert design would have to be changed to eliminate the aluminum pin. On all of the pieces produced during this run, the pin at the vent end was upset, presumably by the high load given to the pin during the short time in which the Al-Si is being forced into the die. Consequently, all pieces made during this run were questionable insofar as closure at the vent end is concerned.

All castings were made on tuballoy pieces of 1.360" diameter (die diameter is 1.440"). Alcoa's #A360 alloy was used throughout. No success was had with the bonding between the aluminum pins (17ST, 58ST, and Al-Si) and the Al-Si at the ends except when the pins were pre-coated with zinc. However, the zinc coated pins were also used in conjunction with a higher bath temperature (1280°F instead of 1220°F).

It was demonstrated conclusively that it is possible to secure a bond between the Al-Si coating and the tuballoy surface. Furthermore, the bond is extremely ductile as compared with bonding by hot dip processes. These bonds were obtained by using short lengths of tuballoy (1" and 2" lengths respectively), so that between 25 and 60 times the volume of the annulus was flowed over the surface of the short tuballoy slug.

Program: On August 10 to 12, a third experimental run will be made as follows: the insert design is changed to provide a hole .375" diameter by .150" deep on each end of the slug. This will enable accurate centering of the slug in the die, but after casting, the piece will have exposed tuballoy at each end. Alcoa has already started construction of a second die which will complete the end closure by washing large amounts of Al-Si around the holes at the ends.

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An experiment will be carried out in which attempts will be made to bond the entire surface of an 8" slug in order to obtain information so that a third die may be designed and constructed. The objective of this test is to determine a reasonable minimum volume that may be flowed over the surface and give bonding over the entire surface of the slug. If all goes well, construction of die #3 should be finished some time during the week of August 20. Die #3 will then take the place of our present die #1.

TECHNICAL DIVISION

A. B. Greninger, Assoc. Director

A. B. Greninger

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